

shows that the institute now has 1016 fellows and 177 associates. The president, in his address, said the most important feature of the year's work has been the inauguration of examinations in chemical technology. The council believes that the institution of these examinations will materially help fellows and associates to obtain employment in chemical industries. Another piece of work accomplished has been the publication of a list of official chemical appointments. Commenting on the value of the qualifications of the associateship and fellowship of the institute, the president showed how the examinations of the institute differ from those of the universities. The latter, he said, are contrived to test the amount of knowledge which a candidate has succeeded in bringing to a focus at a particular moment, while the main object of the institute's examinations is to test what the candidate can actually perform when he is placed as nearly as possible under the same conditions as he would be if working in his own laboratory and within reach of a good chemical library. The candidate who shines in the one will not necessarily shine in the other examination. The university graduate is more qualified to talk and to teach, but the overcrowding of his curriculum leaves him little time in which to practise and acquire technical skill, without which the institute's qualification cannot be attained. It is, Prof. Frankland said in conclusion, this practical character which must be preserved in the institute's examinations, so that fellows and associates may be known for the soundness of their judgment and for their capacity to perform chemical work upon which the public can place implicit reliance.

SOCIETIES AND ACADEMIES.

LONDON.

Faraday Society, February 19.—Dr. T. Martin Lowry in the chair.—The present position and future prospects of the electrolytic alkali and bleach industry: J. B. C. **Kershaw**. The paper opens with a brief historical review. The second part of the paper contains a list of the works now operating in Europe and America, summarising, so far as information is available, power used, type of cell and process employed, and products made. The totals show that about 55,000 h.p. are now being devoted to the production of alkalies and bleach by the electrolytic method, and that plant representing about 13,000 h.p. is lying in reserve. Assuming that all the plants are being worked to the best advantage, the production of 70 per cent. caustic soda at present would be about 110,000 tons per annum, with an equivalent of 231,000 tons of 35 per cent. bleaching powder (2 tons of caustic and 4.2 tons of bleach per E.H.P. year). In conclusion, the future of the industry is discussed.

Royal Meteorological Society, February 20.—Dr. H. R. Mill, president, in the chair.—Report on the phenological observations made during 1906 by observers in various parts of the British Isles: E. **Mawley**. The most noteworthy features of the weather of the phenological year ending November, 1906, as affecting vegetation, were the dry period lasting from the beginning of June until the end of September, and the great heat and dryness of the air during the last few days in August and the first few days in September. Wild plants came into flower in advance of their usual dates until about the middle of April, after which time they were, as a rule, to about the same extent late. Such early spring immigrants as the swallow, cuckoo, and nightingale reached these islands somewhat behind their average dates. The only deficient farm crop, taking the country as a whole, was that of hay, all the others being more or less above average. The yield of apples was about average in all but the north of England and in Scotland, where there was a very scanty crop. Pears and plums were everywhere very deficient, whereas all the small fruits yielded moderately well. As regards the farm crops, the past year proved even a more bountiful one than that of 1905.—The metric system in meteorology: R. **Inwards**. Attention was directed to the advisability of adopting some uniform system by all the meteorological observers upon the globe.

CAMBRIDGE.

Philosophical Society, January 28.—Dr. Hobson, president, in the chair.—Kanalstrahlen in helium: Prof. **Thomson**.—An experiment with a pair of Robison ball-ended magnets: G. F. C. **Searle**. A Robison ball-ended magnet AB is supported on a pivot O close to a drawing board, and a second Robison magnet CD, resting on the board, deflects AB. If p_{AC} denote the perpendicular from O upon AC, the turning moment experienced by AB is the resultant of the four moments $mm'p_{AC}/AC^2$, $mm'p_{AD}/AD^2$, $mm'p_{BC}/BC^2$, and $mm'p_{BD}/BD^2$, where m is the pole-strength of CD and m' that of AB. If h_A , h_B be the perpendiculars from A, B upon the line A_0B_0 , where A_0 , B_0 are the undeflected positions of A and B, the moment due to the earth's magnetic force, H , is $m'H(h_A + h_B)$. Equating these results, the value of m is found in terms of H and of the four distances AC ... and the six perpendiculars h_A , h_B , p_{AC} ... These ten lengths are measured on the drawing board.—A method of determining the thermal conductivity of india-rubber: G. F. C. **Searle**. Steam from a boiler passes through an india-rubber tube, part of the tube being immersed in water contained in a calorimeter. Since the conductivity of india-rubber (0.00042) is small compared with that of water (0.0013), the temperatures of the inner and outer walls of the tube may be taken as equal to θ_1 and θ_2 , the temperatures of the steam and of the well-stirred water in the calorimeter. The conductivity K is found from the rate of rise of temperature of the calorimeter by the equation

$$K = \frac{M}{2\pi l(\theta_1 - \theta_2)} \cdot \frac{d\theta_2}{dt} \cdot \log_e \left(\frac{a}{b} \right),$$

where M is the water equivalent of the calorimeter and its contents, a and b are the external and internal radii of the tube, and l is the length immersed.—A curvature method for measuring surface tension: C. T. R. **Wilson**. To measure the surface tension of mercury, a circular hole of about 1 mm. in diameter is made through a glass plate closing the upper end of a vertical tube. The tube is filled with mercury, and sufficient pressure is applied to give a suitable curvature to the meniscus projecting into the aperture. The curvature is measured by making the meniscus serve as a convex mirror. A microscope is focussed (1) on the centre of curvature (when a reflected image of the eye-piece cross-wires will be seen in focus); (2) on a fibre stretched just above the meniscus; (3) on the virtual image of the fibre formed by the meniscus. From the vertical displacements of the microscope between these three positions the radius of curvature is obtained. If the pressure be changed by a known amount between two such measurements of curvature the surface tension can be deduced.—The application of integral equations to the determination of expansions in series of oscillating functions: H. **Bateman**.

February 11.—Mr. D. Sharp, vice-president, in the chair.—The mode of formation of the initial cell-wall, the genesis and neogenesis of the connecting threads, and the method of connection of living tissue cells: Dr. W. **Gardiner**. Having summarised the existing theories as to the structure of the "initial-wall" of plant cells, and the current view expressed by Strasburger as to the development of connecting threads, the author stated that his own observations appear to prove that the above views are inadmissible.—The ethnology of modern Egypt: Dr. C. S. **Myers**. The measurements, notes, and photographs taken in this investigation lead to the conclusion (1) that, compared with the "prehistoric" people of 5000 B.C., the modern inhabitants show no sensible difference in head measurements or in the degree of scatter of individual measurements about their average; (2) that the modern Copts throughout Egypt are less negroid than the modern Moslem population; (3) that both the Copts and the Moslems in Upper Egypt are more negroid than those in Lower Egypt; (4) that from the anthropometric standpoint there is no evidence of plurality of race in modern Egypt.—Notes on the structure and behaviour of the larva of *Anopheles maculipennis*: A. D. **Imms**. The paper dealt briefly with the occurrence of the larva of *Anopheles maculipennis* in the neighbourhood of Cambridge, together with notes on its bionomics.

EDINBURGH.

Royal Society, February 4.—Dr. R. H. Traquair in the chair.—The fossil Osmundaceæ: R. Kidston and D. T. Gwynne-Vaughan. The paper contained a description of two new species of Osmundites, collected from the Jurassic of Otago, N.Z., by Messrs. Dunlop and Gibb, after whom they have been named. *Osmundites Dunlopi* differs from the hitherto described species in possessing a continuous ring of xylem which is not interrupted by the departure of the leaf-traces. In *O. Gibbiana* the xylem ring resembles that of the recent Osmundaceæ, and is broken up into a large number of separate strands. The structure of two other species, *O. Dowkeri* and *O. skidegatrutis*, was also described and compared with that of the new species. Their discussion of the bearing of the structure of the fossils upon the anatomy of the order led the authors to regard the osmundaceous stele as derived from an ancestral protostelic type with a solid central axis. It was consequently suggested that the Osmundaceæ were derived from the same ancestral stock as the Botryopteridæ.—The development of the anterior mesoderm and paired fin, with their nerves, in Lepidosiren and Protopterus: W. E. Agar. The pro-otic mesoderm is quite unsegmented. The material from which the eye-muscles are derived is, however, drawn from an extended source, probably representing the three anterior somites of van Wighe. A study of the conditions in these fishes lends support to the view of Gegenbaur as to the segmentation of the head in opposition to those of van Wighe. It seems probable that the latter's fourth pro-otic somite represents a fused mass of segments to which the whole of the branchial region morphologically belongs. An extension of splanchnic head structures backwards in relation to trunk myotomes actually takes place in the ontology of these forms. The constrictor muscle of the pharynx is derived from two distinct sources, one splanchnic, from the walls of the pericardio-peritoneal duct, the other somatic, from the occipital myotome γ . A separation of the hypoglossal and brachial plexures is brought about by the greatly distended pronephros separating the ventral processes of those myotomes which supply the hypoglossal and pectoral fin musculature respectively. The pectoral fin is situated in front of the myotomes which supply its mesoderm, and posterior myotomes are gradually ceasing to contribute to its development. The pelvic fin develops at the hind end of its innervation region. Its position is subject to considerable individual variation, but this is always accompanied by a corresponding variation in the position of the cloaca.—Scottish Tardigrada, collected by the Lake Survey: James Murray. Though found in Scotland nearly 150 years ago, the Tardigrada were totally neglected until recently the Lake Survey offered an opportunity for their study. In the paper a summary is given of all that is known about Scottish Tardigrada. The list contains forty-one species. In the Scottish lochs thirty-one species have been found. Most of these are of casual occurrence in lochs, only two or three species being normal inhabitants of water. About twenty species were noted in the Shetland Islands, a fact of great interest being the occurrence of a number of species hitherto known only from Arctic regions. A number of new species discovered had the same limited distribution, being known as yet only from Scotland and Spitsbergen or Franz Josef Land. Seven new species and four new varieties were described.—Arctic Tardigrada, collected by W. S. Bruce: James Murray. Richters had already noted twenty-four species of Arctic Tardigrada. Bruce's collections on various expeditions yielded twenty-eight species, bringing the total number of known Arctic species up to forty. Three new species were described, and there were eight which had been recently discovered in Scotland. There were fourteen species common to Scotland and some part of the Arctic regions. Of the twenty-two species collected in Spitsbergen, twelve were new for that region. Franz Josef Land was virgin soil, and of the nineteen species found there, fifteen occur in Spitsbergen.—*Prymnothonus Hookeri*, Poisson pelagique de l'Erebus et de la Terror retrouve par l'Expedition Antarctique Nationale Ecossaise: Louis Dollo. The fishes collected on the voyage of the *Erebus* and *Terror* were

not all brought home in safety. The most interesting of these lost fishes were the *Prymnothonus* and the *Pagetodes*. The latter, which is probably the same as the *Cryodraco* of the Belgian expedition, was eaten by the cat of the *Terror*. A figure of *Prymnothonus Hookeri* was copied from a sketch by Hooker and published in 1841 by Richardson, who considered it to be a Murænoid allied to the congers. The figure is reproduced by Günther in the eighth volume of his catalogue of the fishes in the British Museum, and he follows Richardson in his description. Later, in his "Pelagic Fishes of the *Challenger*" (1889), Günther places Richardson's specimen third in a series of four small fishes A, B, C, D, and says:—"I have no doubt that all these specimens represent larval conditions of fishes belonging to *Paralepis* or *Sudis* or of genera allied to them. That they all are stages of development of the same generic type of fishes is very improbable, but the second and third specimens may well be considered to be the same type, which provisionally may be designated by the name proposed for it by Richardson." M. Dollo, on the other hand, does not consider the *Challenger* specimens A and B to have anything to do with *Prymnothonus*, and regards specimen D to be a mature specimen of Richardson's fish: He gives a rectified diagnosis of *Prymnothonus Hookeri*, Richardson, from three specimens collected by the Scottish Antarctic Expedition, and places the fish in the family *Paralepidæ*, in accordance with Günther's indications.

PARIS.

Academy of Sciences, February 25.—M. Henri Becquerel in the chair.—The president announced the death of M. Moissan, member of the section of chemistry, and gave a short account of his life-work.—Certain algebraical surfaces related to Abelian functions of the third kind: L. Remy.—Remark on waves of shock. Application to the explosive wave: M. Jouguet. For a wave of shock to be propagated, it is necessary that it should have a velocity higher than, or at least equal to, that of ordinary waves in the medium which precede it, and lower than, or at least equal to, that of the ordinary waves which follow it. Admitting this proposition, the author applies it to the interpretation of the phenomena of the explosive wave.—Some properties of the explosive wave: M. Crussard.—The influence of temperature on absorption in crystals. Magneto-optical phenomena at the temperature of liquid air: Jean Becquerel. At the temperature of liquid air the optical properties of crystals approach the properties of transparent vapours, the absorption bands contracting, forming a line spectrum. The author's interpretation of these results is that the period of the proper movement of the electrons is not influenced by temperature in solid bodies, but that the damping, or the resistance to the particles in vibration, increases and decreases with the temperature. The magneto-optic phenomena exhibited by xenotime and tysonite at the temperature of liquid air have also been studied.—The theory of the formation of aventurine copper glass: V. Auger. Experiments tending to show that the colour is due to the presence of copper silicate.—Ethyl lactyl-lactate: E. Jungfleisch and M. Godchot. A study of the products formed by the action of heat on ethyl ($d+l$) lactate. These are analogous to those obtained by heating lactic acid, but the mechanism appears to be different in the two cases.—The atomic weights, a function of the position which they occupy in the series of their increasing value: Adolphe Minet.—The melting points and boiling points of aliphatic and aromatic hydrocarbons: Gustave Hinrichs. A discussion of a recent paper of M. Tsakalotos.—The coagulation of the latex of caoutchouc and the elastic properties of pure caoutchouc: Victor Henri. The latex of india-rubber is a negative emulsion, and its coagulation can be compared with the precipitation of negative colloids. A study of the conditions of coagulation leads to the conclusions that the coagulation of the latex by electrolytes is determined by the positive ions of the electrolytes, the structure of the coagulum varies with the nature and concentration of the bodies employed for the coagulation, a feeble coagulant producing a pulverulent or flocculent precipitate, an energetic coagulant an elastic clot with a reticular structure. The elastic properties of the india-rubber obtained depend

greatly on the nature of the coagulant employed, there being a distinct relation between the fineness of the reticular structure of the clot and the elastic properties.—The presence of phenylethyl alcohol in the essence from the needles of the Aleppo pine of Algeria: Emilian **Grimal**. Details are given of the method of extraction and identification of the phenylethyl alcohol.—The successive distributions of terpenic compounds in various organs of the living plant: Eug. **Charabot** and G. **Laloue**.—Fluorine in the shells of molluscs: P. **Carles**. The presence of fluorine in the mollusc shells is proved: if the shell is treated with hydrochloric acid, the presence of fluorine may be easily overlooked, since hydrofluoric acid is carried away with the carbon dioxide.—A new genus of Pennatulidae: Ch. **Gravier**.—*Giardia alata*, a new species: J. **Kunstler** and Ch. **Gineste**.—Some physico-biological conditions of Lake Mèlah, Algeria: J. **Bounhiol**.—The toxic effects of oysters: J. **Baylac**. Apart from the possibility of bacterial infection, the fluid of the oyster itself possesses toxic effects, and these are greatly increased by keeping at a temperature of about 16° C. for two or three days. The author is of opinion that many accidents attributed to the bacterial contamination of oysters are really due to the increase in the toxic power of the natural fluids of the oyster under the influence of temperature.—Do elephants possess a pleural cavity? Mme. Marie **Phisalix**. A reply to a recent note of M. Giard.—New researches on the transplantation of nerve ganglia; transplantation in the frog: G. **Marinesco** and J. **Minéa**. In cold-blooded animals, the transplanted ganglion cells live for a much longer time after transplantation, and react and repair their lesions more readily than the ganglion cells of animals at constant temperature.—The distribution of microbial secretions, in a culture, between the liquid of this culture and the micro-organisms. Free toxins and adherent toxins. Extracellular bodies and intra-cellular bodies: MM. **Charrin** and **Goupil**.—A remarkable case of an aneurism of the ophthalmic artery cured by gelatin: MM. **Lancereaux** and **Paulesco**. In the treatment of aneurisms of the aorta by gelatin injection the improvement, although marked, proves to be only temporary, and the effect of each injection is less than that of the one preceding, no permanent effect being produced. In the case described the cure was complete and permanent after thirty-nine injections.

DIARY OF SOCIETIES.

THURSDAY, MARCH 7.

ROYAL SOCIETY, at 4.30.—Experiments with Vacuum Gold-Leaf Electroscopes on the Mechanical Temperature Effects in Rarefied Gases: Dr. J. T. Bottomley, F.R.S., and F. A. King.—On the Resistance of Air: A. Mallock, F.R.S.—Electric Furnace Reactions under High Gaseous Pressures: R. S. Hutton and J. E. Petavel.—On the Absorption of Water by Cotton and Wool: Dr. M. W. Travers, F.R.S.

CHEMICAL SOCIETY, at 8.30.—The Constitution of Chaulmoogric and Hydnoicarpic Acids: M. Barrowcliff and F. R. Power.—Volume Changes which accompany Transformations in the System $\text{Na}_2\text{S}_2\text{O}_3$, H_2O : H. M. Dawson and C. G. Jackson.

AERONAUTICAL SOCIETY, at 8.—Wings *v.* Screws: Colonel J. D. Fullerton, R.E.—The Free Lever in the Flying Machine: Herr Karl Milla.—Theory of Sailing Flight: José Weiss.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—The Transmission of Electrical Energy by Direct Current on the Series System: J. S. Highfield.

LINNEAN SOCIETY, at 8.—On the Development of the Frog: Miss N. F. Layard.—Biscayan Plankton, Decapoda: S. B. Kemp.—A Special Point in the Colour Adjustment of Chamæleon: Prof. E. B. Poulton, F.R.S.—New Channel Island Plants: G. Claridge Druce.—*Exhibitions*: Specimens of *Nitella ornithopoda*, A.Br.: H. and J. Groves.—(1) Probate of the Will of Richard Anthony Salisbury; (2) Manuscripts of Dr. W. J. Burchell: Prof. E. B. Poulton, F.R.S.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY, at 8.—Types of Enclosed Steam Water Heaters: C. R. Allensby.

FRIDAY, MARCH 8.

ROYAL INSTITUTION, at 9.—Certain Seasonal Diseases of the Sheep, and the Means of Preventing Them: Prof. D. J. Hamilton.

PHYSICAL SOCIETY, at 8.—The Rate of Recovery of Residual Charge in Electric Condensers: Prof. Trouton and Mr. Russ.—Experimental Mathematics: Mr. Pichon.—An Instrument to describe Families of Equiangular Spirals: Mr. Blakesley.—A Micromanometer: Mr. Roberts.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Corrugations on Tram-Rails: A. T. Arnall.

MALACOLOGICAL SOCIETY, at 8.—On the Non-Marine Mollusca of the Mylne Collection: A. S. Kennard and B. B. Woodward.—Notes on Holocene Mollusca from Ightham: A. S. Kennard and B. B. Woodward.—Descriptions of Four New Species of Melania from New Ireland and Ke-lan-tan: H. B. Preston.—On the Arms of the Belemnite: G. C. Crick.

ROYAL ASTRONOMICAL SOCIETY, at 5.—Computation of Secular Perturbations: R. T. A. Innes.—Observations of Occultations: Rev. A. L. Williams.—Baxendell's Observations of U Geminorum: Edited by H. H. Turner.—On the Classification of Long-period Variable Stars, and a Possible Physical Interpretation: H. H. Turner.—Perturbations of Halley's Comet: P. H. Cowell and A. C. D. Crommelin.

SATURDAY, MARCH 9.

ROYAL INSTITUTION, at 3.—Röntgen, Kathode, and Positive Rays: Prof. J. J. Thomson, F.R.S.

MONDAY, MARCH 11.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Journeys in Turkey-in-Asia: Mark Sykes.

TUESDAY, MARCH 12.

ROYAL INSTITUTION, at 3.—The Visual Apparatus of Man and Animals: Prof. William Stirling.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Construction of Overhead Electric Transmission-lines: A. P. Trotter.

WEDNESDAY, MARCH 13.

SOCIETY OF ARTS, at 8.—Mediæval Stained Glass, its Production and Decay: Noel Heaton.

GEOLOGICAL SOCIETY, at 8.—A Silurian Inlier in the Eastern Mendips: Prof. Sidney H. Reynolds.—On Changes of Physical Constants which take place in certain Minerals and Igneous Rocks, on the Passage from the Crystalline to the Glassy State; with a short Note on Eutectic Mixtures: J. A. Douglas.

THURSDAY, MARCH 14.

ROYAL SOCIETY, at 4.30.—*Probable Papers*:—On the Gravitational Stability of the Earth: Prof. A. E. H. Love, F.R.S.—The Total Ionisation of Various Gases by the α Rays of Uranium: T. H. Laby.—On the Ionisation of Various Gases by the α , β and γ Rays: R. D. Kleeman.

ROYAL INSTITUTION, at 3.—Biology and Progress: Dr. C. W. Saleeby.

SOCIETY OF ARTS, at 4.30.—The City of Madras: Sir James Thomson.

MATHEMATICAL SOCIETY, at 5.30.—Exhibition of a New Calculating Machine: G. W. Evans-Cross.—On the Reduction of the Factorisation of Binary Septans and Octans to the Solution of Indeterminate Equations of the Second Degree: Dr. T. Stuart.—Invariants of the General Quadratic Form *Modulo 2*: Prof. L. E. Dickson.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—*Adjourned discussion*: The Transmission of Electrical Energy by Direct Current on the Series System: J. S. Highfield.

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